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Dated: December 1, 2003

Signature: *E. Thomas Wheelock*

(E. Thomas Wheelock)

Docket No.: 369212000131
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reissue Patent Application of:
Hirokazu SUGIHARA et al.

Patent No. 5,563,067, issued October 8, 1996

Reissue Application No.: 09/688,077

Group Art Unit: 1744

Filed: October 13, 2000

Examiner: D Redding

For: CELL POTENTIAL MEASUREMENT
APPARATUS HAVING A PLURALITY OF
MICROELECTRODES

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DEC 11 2003
TC 1700

APPELLANT'S BRIEF

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

This is an appeal from the final rejection of claims 14-23, all of the claims in this reissue application, in Paper No. 9, mailed November 6, 2003. The Notice of Appeal was filed on April 30, 2002.

The fees required under § 1.17(f), any required petition for extension of time for filing this Brief, and fees for such an extension of time, are dealt with in the accompanying document entitled TRANSMITTAL OF APPEAL BRIEF.

This Brief is transmitted in triplicate.

This Brief contains items under the headings and topics required by 37 C.F.R. § 1.192 and M.P.E.P. § 1206.

PA-825666

12/05/2003 AWD/DAF1 00000052 09688077
01 FC:1402 330.00 DA

I. REAL PARTY IN INTEREST

The real party in interest for this appeal is:

Matsushita Electric Industrial Company, Limited.

II. RELATED APPEALS AND INTERFERENCES

There are currently no other appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Total Number of Claims in Application

There are 10 claims pending in application.

B. Current Status of Claims

1. Claims canceled: 1-13
2. Claims withdrawn from consideration but not canceled: 0
3. Claims pending: 14-23
4. Claims allowed: 0
5. Claims rejected: 14-23

C. Claims On Appeal

The claims on appeal are claims 14-23

IV. STATUS OF AMENDMENTS

The claims on appeal (Nos. 14-23) have not been amended since the filing of the Preliminary Amendment on October 13, 2000. That amendment has been entered.

V. SUMMARY OF INVENTION

The claims on appeal deal with a device that is used to continuously measure electrical, physiological, complex waveforms in “neural samples” and to stimulate those samples as needed. A “neural sample” might be a slice of brain taken from a laboratory rat in such a way that it still evidences some significant portion of the electrical activity of a brain in a living animal. In general, the measuring device has three required parts:

a.) a “sample holding” component (No. 1 in Fig. 1) that includes a surface with a number of electrodes formed in a matrix (See Fig. 3) upon which the “neural sample” rests -- the substrate surface and the electrodes may be used as a part of a culturing apparatus to promote the continuing viability of the “sample” as it exists outside of the donor animal -- and the electrodes are connected to conductive pathways (variously, No. 12 in Fig. 3; No. 9 in Fig. 2; and to the connectors No. 5b in Figs. 2 or 8) out of the sample holding component,

b.) a signal processor, e.g., a PC, suitable for taking the complex signals from the conductive pathways and processing the signals to reflect them as complex waveforms, and

c.) a stimulation signal supply that is connectable to each electrode to supply stimulation to the “sample” as needed. Figure 9 shows the overall arrangement -- the sample holding component (No. 1), the measuring and displaying signal processor (No. 30), and the stimulation signal supply (No. 30 -- the PC -- sent through the D/A converter No. 32).

VI. ISSUES

Were claims 14 to 23, all of the claims in the appealed reissue application, properly rejected on the basis of improper recapture under 35 USC 251?

VII. GROUPING OF CLAIMS

Only for purposes of this Appeal Brief and, further, for the specific “Recapture” legal issue raised, all of the claims on appeal rise or fall together.

VIII. ARGUMENTS

This is an appeal in a broadening reissue application. This single issue on appeal here is whether the claims presented in this reissue application attempt improperly to recapture subject matter which was surrendered in the original application to obtain issuance of the patent.

It is this tension and balance of permitted broadening versus impermissible recapture that is the grist of this appeal.

First of all, patent owners and patentees are given the statutory right to broaden their patents by the statute (35 USC 251) if the reissue application is presented to the United States Patent and Trademark Office (“USPTO”) within two years of the issue date of the patent with some indication that the applicant desires broadening of the issued claims.

Some writers have urged that the public should have the ability to rely upon a patent claim’s scope, as issued, as the ultimate region of protection secured by the patentee. Thus, in the absence of continuing applications, the public would be able to determine by difference, what the inventor had “dedicated to the public” or had “left on the table.” Certainly, there is a need to know what technology may be taken without compensation from a patent disclosure. However, the broadening reissue statute is a portion of the overall statutory scheme that specifies what a member of the public should reasonably know from a review of a patent. In *In re Doyle*, 293 F.3d 1355, 63 USPQ2d 1161 (Fed. Cir. 2002), the Court observed that the

“public knows, or should know, that an issued patent can be broadened by reissue during a two-year period following issuance. The public is therefore on notice that at least some matter can be ‘dedicated to the public’ in error, and that the error, if caught in time, can be corrected by reissue. And if the patentee succeeds in obtaining a reissue that alters the scope of her right to exclude, then the public interest is protected through intervening rights.”

Appellants have chosen to correct an error in the scope of the patent claims by filing a broadening reissue application at an appropriate time. This application is a continuation of an earlier reissue patent application filed within the two-year time period specified by the statute and each case has been identified as one containing broadened claims.

However, a reissue applicant may not expect a broadening reissue application to be successful where that application attempts to recapture material previously surrendered in order to obtain allowance of original patent claims.

The term “surrender” has a very special meaning in reissue proceedings. As it deals with this area of the law, the word is properly used only in the following way: “the recapture rule, therefore, prevents a patentee from regaining through reissue the subject matter that he surrendered in an effort to obtain to allowance of the original claims.” and specifically “[t]o determine whether an applicant surrendered particular subject matter, we look to the prosecution history for arguments and changes to the claims made in an effort to overcome a prior art rejection.”¹

Synthesized thus: An improper “recapture” deals only with “surrender” of subject matter made in an effort to overcome a rejection, be the rejection statutory or otherwise, such as a rejection based upon 35 USC 102 or 103. That is the basic point from which other analysis must proceed. Simply changing narrowing claim breadth during prosecution, without more, will not invoke the recapture rule during a reissue proceeding. The Court and the Board have provided guidance in the general form of rebuttable presumptions upon which to rely in those instances where there is a paucity of evidence, or where there is no evidence, tending to show whether a patent applicant “surrendered” subject matter and the reasons for doing so.

In the case on appeal, the prosecution record shows that there were no rejections of the claims at all. Specifically, there were no rejections based on prior art lodged against any claim in any Office Action. The application was allowed on a first Office Action and the amendments made by Examiner’s Amendment. The single bit of evidence to be dealt with here based on prosecution history, is the following excerpt from the Examiner Interview Summary Record (Paper No. 3½, dated (apparently) November 14, 1995):

“Applicant agreed to rewrite claim 1 as claim 16 including the limitations of claims 5 and 8. The prior art of record fails to teach the structural features of claims 5 and 8.”

¹ See, *In re Clement*, 131 F.3d 1464, 45 USPQ2d 1161 (Fed. Cir. 1997).

Although this quotation is read in the Final Rejection here as at least implying that claim 1 would have been rejected on the basis of the “prior art of record” (were a rejection to have been made), as will be explained below, the facts do not bear out such an implication. It should be noted that there are no comments of any kind by the patentees or by their attorney during prosecution of the application. Hence there are no explicit arguments or comments tending to prove that patentee made any concession in an attempt to gain allowance of the claims.

Returning for a moment to *In re Clement*, the Court discusses a stepwise procedure used to determine whether subject matter in claims in a reissue application is properly subject to the recapture rule, even when no overt evidence is present to determine whether a concession relating to patentability has been made. The analytical process specified in *In re Clement* requires that the USPTO first determine whether, and how, the claims are broader. Appellants in this instance will readily agree that the claims on appeal are broader than those found in the issued patent.

In re Clement then requires the USPTO to “determine whether the broader aspects of the reissue claims relate to the surrendered subject matter.” Specifically, “to determine whether an appellant surrendered particular subject matter, we look to the prosecution history for arguments and changes to the claims made in an effort to overcome a prior art rejection.”

In re Clement goes on to say that “although the recapture rule does not apply in the absence of evidence that the applicants amendment was ‘an admission that the scope of the claim was not in fact patentable,’ the Court may draw inferences from “changes in claim scope when other reliable evidence of patentees’ intent is not available...”² The Court went on to say that “deliberately canceling or amending a claim in an effort to overcome a reference strongly suggests that an applicant admits that the scope of the claim before the cancellation or amendment is unpatentable, but it is not dispositive because other evidence in the prosecution history may indicate the contrary...”

The converse of the Court’s statement is this: if amending a claim has no apparent connection to the prior art present in the application, there may be an inference that the amendment

² citing *Ball Corporation v. United States*, 729 Fed.2d 1429, 221 USPQ 289 (Fed. Cir. 1984).

was **not** done (or permitted, in this instance) to overcome a prior art rejection. This would be especially so if, as here, there is no prior art rejection or that any such rejection is only “implied.”

In this instance, a substantive comparison of claim 1 as originally filed in the application and “the prior art of record” mentioned in the quoted Notice of Allowance should demonstrate that the “implied” rejection of the Examiner Interview Summary Record was not a statement of a potential statutory problem with the claims under 35 USC 102 or 103.

Appellants recognize that there is a burden of proof on a reissue applicant in such cases but the burden is treated in much the same way as is a narrowing amendment in a doctrine of equivalence analysis after the United States Supreme Court decision in Festo Corp. v. Shoketsu Kinzoku Kogyo Kubishiki Company Limited 535 US 722 (2002).

In one of the Federal Circuit’s first cases after Festo, Pioneer Magnetics v. Microlinear Corp.,³ the Federal Circuit noted that in an In re Clement analysis, after determining whether an amendment narrowed a literal scope of a claim, “next we examine the reason of why the applicant amended a claim....the burden is on the patent holder to establish that the reason for amendment is not one related to patentability.”⁴

It is apparent that the amendments made to claim 1 (by adding the material found in two depending claims) was not related to patentability.

Specifically, claim 1, as initially filed in the application for patent, provided:

“1. A cell potential measurement apparatus for measurement of electric physiological characteristics of cells, comprising:

(A) an integrated cell holding instrument provided with a plurality of microelectrodes of a substrate, a cell holding part for placing cells thereon, and an electric connection means for providing an electric signal to said microelectrodes and for leading out an electric signal from said microelectrodes;

³ 238 F.3d 1298, 57 USPQ2d 1553 (Fed. Cir. 2001)

⁴ Citing Warner Jenkinson, 520 US at 32-33

(B) a stimulation signal supply means to be connected to the electric connection means of said integrated cell holding instrument for providing electric stimulation to said cells: and

(C) a signal processing means to be connected to the electric connection means of said integrated cell holding instrument for processing an output signal arising from electric physiological activities of said cells.”

The only references apparently of record at that time were of two sets, the first set being three patents cited by the examiner and the second set cited by the then-applicants:

cited by the USPTO

4,072,578 to Cady et al.

5,187,096 to Giaever et al.

5,432,086 to Franzl et al.

cited in the IDS

JP 63-84476 -- abstract

JP 3-265814 -- abstract

JP 4-204244 -- abstract

JP 55-84148

Copies of these references or abstracts are attached to this Brief.

In a simple summary (for rough comparison with the patents and publications) as originally filed, the device recited in claim 1 required three parts: a.) an integrated cell holding portion with microelectrodes, a cell holding part, and electrical connection, b.) a stimulation signal supply and c.) a signal processor. In very gross terms, it included a cell holder with a number of electrodes, a stimulator of some kind, and a signal processor (e.g., a PC) for analyzing “an output signal rising from electric physiological activities” of the cells.

CADY PATENT

The Cady reference (4,072,578) shows a “multi chambered module (10)” having what appears to be a pair of “terminal portions” in each chamber--see Figures 2 and 3. The concept of the device is to measure “impedance,” that is, complex resistance.

The device shown in the Cady patent utilizes an electric source, but the source is for the specific purpose of measuring a passive impedance value. Indeed, the device is specifically noted to

be only faster than other procedures known in the prior art for “determination of metabolic growth, the time for detection of harmful amounts or types of microorganisms is tremendously shortened over the slower, known techniques.” Column 4, lines 58 *et seq.* Said another way, any power supply described in the Cady patent is one that is of sufficiently low power that it does not stimulate the growth of microorganisms. It is not a stimulator.

Consequently, the Cady reference does not show a “stimulation signal supply means”. There would be no need to revise claim 1 in some fashion to avoid the Cady reference.

GIAEVER PATENT

The Giaever patent (5,187,096) is quite similar to the Cady patent in that (at the very least) it fails to show a stimulation signal supply means as required by then-claim 1. The Giaever reference discloses the application of an alternating current (AC) current to the fluid and the cells within Giaever’s chamber or chambers. However, such an application of power is not in an amount that stimulates the cells. Specifically, the patent itself notes that “the cells themselves are not effected[sic] by the low AC current or the weak electrical fields.” See column 6, lines 55-57. If the intent of the described device and procedure is not to affect the cells, then it cannot be said that the patent provides a stimulation supply means.

FRANZL PATENT

The Franzl et al reference (U.S. Pat. No. 5,432,086) is again quite similar to Cady and Giaever in that it is a device for measuring impedance in a series of wells containing cells. Franzl’s device also applies a voltage to those wells. However, Franzl’s device measures impedance. So, for the reasons mentioned above in discussing what “impedance” is and how it is measured, and why it is not to be considered a stimulation means, Franzl is deficient as a reference against claim 1 as well. Franzl et al. additionally is deficient in that it fails to describe or show an integrated cell holding

instrument having microelectrodes on a substrate and configured in some fashion to have cells sitting thereon. The electrodes are placed into cells from above and are suspended in the fluid.

Additionally, each of Cady, Giaever, and Franzl is substantially deficient in that none of them show a “cell potential measurement apparatus” for “measurement of electrical physiological characteristics”. Said in simpler terms: none of the described devices in the three patents measure the “cell potential” i.e., potential or voltage created by the cell as a measure of the resulting physiological activity of the cell or cells. Claim 1 requires that the signal processing means be able to process “an output signal arising from electric physiological activities of said cells.” Impedance is not a signal. None of these devices anticipate the structure and components required by the claim.

In absolute candor, an analogy might be: the devices shown in the three cited references are as similar to the claimed device as a passive stethoscope is to an active CT scanner. One merely listens; the other causes and analyzes.

Again, there is no reason why anyone, upon reviewing the three cited U.S. patents, would find it desirable to add any material to the claims to quiet a proposed or implied rejection based thereon.

As to the Japanese references, the cited abstracts are suitable for showing what the USPTO and appellants’ counsel were reviewing at the time for the purpose of determining whether, as an initial assessment, whether any change was appropriate for the claims.

JP 63-84476

The Derwent Abstract for this Kokai shows a cell fusion chamber having electrodes. No mention is made of a stimulator nor of an attempt to measure complex neural signals. The reference does not teach the device found in originally-filed claim 1.

JP 3-265814

The Derwent Abstract for this Kokai shows a microscope for injecting genes into cells.

JP 4-204244

The Derwent Abstract for this Kokai describes a composite electrode and multi-point measurement from nerve cells, but not neural samples capable of making complex electrical waveforms. Consequently, neither the appropriately equipped signal processor nor the stimulation supply required by claim 1 is shown in the published application.

JP 55-84148

The figures do not show a cell structure suitable for measuring electrical impulses from a neural sample.

As noted in the *In re Clement* case it is appellants' task only to show that the reason for amendment is not related to patentability. Appellants need not satisfy the more intricate question of why claim 1 was amended.

Since Appellants have satisfied the required analysis that there is no "recapture" since no question of patentability was before the USPTO or the then-applicants, reversal of the final rejection is appropriate and is requested.

IX. CLAIMS INVOLVED IN THE APPEAL

A copy of the claims involved in the present appeal is attached hereto as Appendix A.

Dated: December 1, 2003

Respectfully submitted,

By 

E. Thomas Wheelock

Registration No.: 28,825

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APPENDIX A**CLAIMS ON APPEAL**

14. A measurement apparatus for continuous, simultaneous measurement of electrical physiological complex waveforms from neural samples, comprising:

- (A) an integrated neural sample holding instrument provided with a plurality of microelectrodes arranged in a matrix form and adherent to a substrate, conductive pathways connected to the microelectrodes, said microelectrodes being within a neural sample holding part which is constructed to contain said at least one said neural sample and including said plurality of microelectrodes; said conductive pathways for providing electric stimulation signals to said microelectrodes and for leading out an electric signal from said microelectrodes;
- (B) a signal processor connectable to said conductive pathways of said integrated neural sample holding instrument suitable for processing said signals arising from electric physiological activities of said at least one neural sample and reflecting said signals as said complex waveforms, and
- (C) a stimulation signal supply connectable to all of said conductive pathways for providing electric stimulation to said neural sample.

15. The measurement apparatus of claim 14 further comprising a culturing apparatus for maintaining an environment for culturing said neural sample on said integrated neural sample holding instrument.

16. The measurement apparatus of claim 15 wherein the culturing apparatus comprises a temperature adjustment for maintaining a constant temperature, a circulator for circulating a solution, and a gas supply.

17. The measurement apparatus of claim 14 wherein said plurality of microelectrodes comprise 64 electrodes arranged in eight columns and eight rows.

18. The measurement apparatus of claim 14 wherein said microelectrodes each have an electrode area of $4 \times 10^2 \mu\text{m}^2$ to $4 \times 10^4 \mu\text{m}^2$.

19. The measurement apparatus of claim 14 further comprising an optical microscope, an image pick-up device, and an image display device connected to the optical microscope.

20. The measurement apparatus of claim 19 further comprising an image storage device.

21. The measurement apparatus of claim 14 wherein said stimulation signal supply comprises a pulse signal generator.

22. The measurement apparatus of claim 14 wherein said signal processor further comprises a multichannel amplifier which amplifies said signal arising from neural sample activities and a multi-channel display device which displays an amplified signal waveform in real-time.

23. The measurement apparatus of claim 22 further comprising a computer which outputs said stimulation signal via a D/A converter and receives and processes an output signal arising from electric physiological activities of said neural sample via an A/D converter.

? 36921-2000131-06619

? b 351

1 PN=JP 63084476'

3/9/1

DIALOG(R)File 351:Derwent WPI

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007509458

WPI Acc No: 1988-143391/ 198821

XRAM Acc No: C88-063910

Cell fusion chamber - comprises pair of plate-type electrodes and transparent glass thin plate adhered to electrodes

Patent Assignee: SHIMADZU SEISAKUSHO KK (SHMA)

Number of Countries: 001 Number of Patents: 002

Patent Family:

Patent No	Kind	Date	Applicat No	Kind	Date	Week
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JP 63084476	A	19880415	JP 86227392	A	19860925	198821 B
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JP 94091812	B2	19941116	JP 86227392	A	19860925	199444
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Priority Applications (No Type Date): JP 86227392 A 19860925

Patent Details:

Patent No	Kind	Lan	Pg	Main IPC	Filing Notes
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JP 63084476	A		3		
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JP 94091812	B2			C12M-001/00	Based on patent JP 63084476
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Abstract (Basic): JP 63084476 A

A cell fusion chamber, where a pair of plate-type electrodes except their part for accommodating cell suspension are adhered and fixed on a support so as to be arranged parallel to each other. A transparent glass thin plate is adhered to the electrodes as the floor plate for the cell suspension container and the space between the electrodes except for the cell suspension container is filled with an insulator.

USE/ADVANTAGE - However, conventional transparent glass is thick and the distance between cells and desired glass is 1.0-4.5 mm and, therefore, 400-fold enlargement is at best. In this chamber, by using a thin transparent glass, more than 600-fold enlargement is possible and the chamber is useful for observation of cell fusion of small cells like animal cells and yeast cells.

0/3

Title Terms: CELL; FUSE; CHAMBER; COMPRISE; PAIR; PLATE; TYPE; ELECTRODE; TRANSPARENT; GLASS; THIN; PLATE; ADHERE; ELECTRODE

Derwent Class: D16; J04

International Patent Class (Main): C12M-001/00

International Patent Class (Additional): C12N-013/00; C12N-015/02

File Segment: CPI

Manual Codes (CPI/A-N): D05-H02; D05-H08; J04-B

1 PN='JP 4204244'

5/9/1

DIALOG(R)File 351:Derwent WPI

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009168746 **Image available**

WPI Acc No: 1992-296180/ 199236

XRAM Acc No: C92-132146

XRPX Acc No: N92-226406

Integrated composite electrode for measuring electrical activity of nerve cells - comprises insulating baseplate, electrodes set as close as possible to one another, wiring section and insulator layer

Patent Assignee: MATSUSHITA ELEC IND CO LTD (MATU)

Number of Countries: 001 Number of Patents: 002

Patent Family:

Patent No Kind Date Applicat No Kind Date Week

JP 4204244 A 19920724 JP 90337973 A 19901130 199236 B

JP 2949845 B2 19990920 JP 90337973 A 19901130 199944

Priority Applications (No Type Date): JP 90337973 A 19901130

Patent Details:

Patent No Kind Lan Pg Main IPC Filing Notes

JP 4204244 A 5 G01N-027/30

JP 2949845 B2 4 G01N-027/30 Previous Publ. patent JP 4204244

Abstract (Basic): JP 4204244 A

In an integrated composite electrode, electrodes are set at the most closest intervals on an insulating baseplate, a wiring section, where lead wires are radially set from the electrodes, is provided, and an insulator layer, where holes are formed on the electrodes, is provided on the wiring section.

USE/ADVANTAGE - The integrated composite electrode is used in the electrical measurement of vital activity, partic. electrical action of nerve cells. It enables effective concurrent multi-point measurement of electrical action of nerve cells and signal transmission over multi-cells. Cultivation of nerve cells on the integrated composite electrode can be made.

Dwg. 1/2

Title Terms: INTEGRATE; COMPOSITE; ELECTRODE; MEASURE; ELECTRIC; ACTIVE; NERVE; CELL; COMPRISE; INSULATE; BASEPLATE; ELECTRODE; SET; CLOSE; POSSIBILITY; ONE; WIRE; SECTION; INSULATE; LAYER

Derwent Class: L03; S03

International Patent Class (Main): G01N-027/30

International Patent Class (Additional): C12M-001/34

File Segment: CPI; EPI

Manual Codes (CPI/A-N): L03-H; L03-J

Manual Codes (EPI/S-X): S03-E03C; S03-E14H9

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1. ☐ 2/9/1 00596548

ELECTRIC CONDUCTION DEVICE FOR MEASURING LIVING BODY

PUB. NO.: 55 -084148 [JP 55084148 A]

PUBLISHED: June 25, 1980 (19800625)

INVENTOR(s): KATO MASAO

APPLICANT(s): TOSHIBA CORP [000307] (A Japanese Company or Corporation), JP (Japan)

APPL. NO.: 53-157631 [JP 78157631]

FILED: December 22, 1978 (19781222)

INTL CLASS: [3] A61B-005/04; A61N-001/04

JAPIO CLASS: 28.2 (SANITATION -- Medical)

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⑪ 公開特許公報 (A)

昭55—84148

⑫ Int. Cl.³

A 61 B 5/04

A 61 N 1/04

識別記号

庁内整理番号

7033—4C

6404—4C

⑬ 公開 昭和55年(1980)6月25日

発明の数 1

審査請求 未請求

(全 3 頁)

⑭ 生体計測用電気導通装置

⑮ 株式会社玉川工場内

⑯ 特 願 昭53—157631

⑰ 出 願 人 東京芝浦電気株式会社

⑱ 出 願 昭53(1978)12月22日

川崎市幸区堀川町72番地

㉑ 発 明 者 加藤正男

㉒ 代 理 人 弁理士 則近憲佑 外 1 名

川崎市高津区久本30東京芝浦電

特許法第65条の2第2項第4号の規定により×
印の部分は不掲載とする。

明 細 書

1. 発明の名称

生体計測用電気導通装置

2. 特許請求の範囲

(1) 生体に密着して電気的信号を伝達するようにした電極と、該電極に接触して外部との電気的導通を図るようにした電極ホルダーとからなる電気導通装置において、電極及び電極ホルダーの各に対応する面にそれぞれ複数個の導電性細材を配置し、これら両導電性細材を組み合わせることによつて電気的導通を図つたことを特徴とする生体計測用電気導通装置。

(2) 前記導電性細材を、テープとしたことを特徴とする特許請求の範囲第1項記載の生体計測用電気導通装置。

3. 発明の詳細な説明

本発明は、医療分野における患者監視装置等に用いられる生体計測用電気導通装置に関する。

心電図装置や脳波記録装置等の医学装置において使用される電気導通装置は生体(人体)に密着

して電気的信号伝達を行う電極と、該電極に接触して外部装置との電気的導通を図るための電極ホルダーとによつて構成される。そして、従来は第1図(a)、(b)に示すような電気導通装置が使われていた。即ち、電極は同図(a)に示すように銀—塩化銀板1上に銀板2を積層し、この銀板2の中央上部に略球形を為す銀製のホック3を設け、前記積層板1,2の周面を絶縁性ケース4で被覆したものであり、電極ホルダーは同図(b)に示すように先端ベサミ形状のトリップ5の先端円形部内周面に外部リード線7に接続される接触金属板6を設けたものである。そして、この電極ホルダーのホック5の先端円形部で前記電極のホック3を挟むことによつて両者の電気的導通を図るようにしている。

しかしながら、このような電気導通装置では電極に対する電極ホルダーの着脱が困難であるという問題を有する。即ち、電極ホルダーの形状が大きくなると患者に不快感を与えたり、診断時に邪魔になるため、その形状を極力小さくせざるを得ないが、余り小さくすると逆に、ホックを挟みこ

くくなり、接触が不十分となると共に、増設が困難になるという問題が生ずる。

本発明は前記問題点を解決するためになされたもので、電極に対する電極ホルダーの増設が容易になると共に、電極ホルダーの小型化が図れる電気導通装置を提供することを目的とするものであり、このために、生体に密着して電気的的信号を伝達するようにした電極と、該電極に接触して外部との電気的導通を図るようにした電極ホルダーとからなる電気導通装置において、電極及び電極ホルダーの各対応する面にそれぞれ複数の導電性層材を積設し、これら両導電性層材を結み合わせるこ

とによつて電気的導通を図つたことを特徴とするものである。

以下実施例により本発明を具体的に説明する。

第2図(4)、(5)は本発明装置を構成する電極の構造の一例を示す図であり、第3図(4)、(5)はそれに接触する電極ホルダーの構造の一例を示す図である。電極は、銀-塩化銀板8と、該板8上に積層され中央部に円形状の孔9を有する銅板9と、尚

(3)

銅板9と前記銀-塩化銀板8との間に挟み込まれた円形状の樹脂板10と、この樹脂板10に積設され、上方に突出する複数の樹脂性の線維（線材ともいう）11と、これらの外周面を覆うように形成された絶縁性ケース12とからなり、銀-塩化銀板8の底面に塗られたペースト13を介して人体17の表面に密着されるようになつてゐる。尚、前記樹脂板10及び線材11の表面には銀が積着されている。電極ホルダーは、前記電極の円形樹脂板10と略同等の大きさを有する円形樹脂板13と、該樹脂板13に積設された複数の樹脂製線材14と、前記樹脂板13及び導電用リード線15を保持する絶縁性保持部材16とからなる。尚、前記樹脂板13及び線材14の表面には銀が積着されており、又、この線材14の分布面積は前記電極の線材11の分布面積と略同等となるように形成されており、更に保持部材16には前記線材14を逃げるための孔16aが設けられている。尚、前記樹脂板10、13及び11、14は例えば市販されてい

(4)

（注）を以つてこれに替えることができる。又、電極及び電極ホルダーを構成している金属の成分、構造、形状、或いは電極保持用ケース（部材）の構造は前記実施例に限定されない。

このような構成の電気導通装置を使用するには、人体17の表面に貼着された電極の表面部中央の複数の線材11上に電極ホルダーの複数の線材14を重ね合わせて押さえつけるようにすればよい。すると、両線材が各々結み合つて相互の接触を保つこととなる。このため、人体表面の起電力が、ペースト13、銀-塩化銀板8、銀の蒸着が施された樹脂板10及び線材11（以上電極部分）、更に、銀の蒸着が施された線材14及び樹脂板13（以上電極ホルダー部分）を介して導電用リード線を介して図示しない処理装置に伝達される。このとき、複数の線材同士が結み合つた状態であるため電極と電極ホルダーとの固定は強固にされている。そして、電極の取外しは電極ホルダーをより持ち上げるだけで簡単に行うことができる。

(5)

以上詳述した本発明装置によれば、電極と電極ホルダーとの増設が容易であると共に、両者の結合は複数の線材同士の結み合いのみで強固にされるため電極及び電極ホルダーの形状を可能な限り小さくすることができる。尚、前述のように市販されているペーストテープを使用すれば装置全体の価格の低減化が図れるという利点をも有する。

4. 図面の簡単な説明

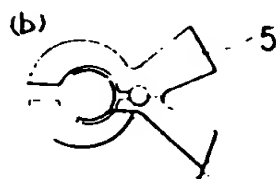
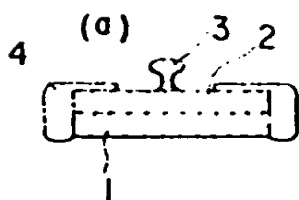
第1図は従来装置の一例を示すものであり、同図(4)は電極の断面図、同図(5)は電極ホルダーの平面図、第2図は本発明装置に用いられる電極の一例を示すものであり、同図(4)は断面図、同図(5)はその平面図、第3図は電極ホルダーの一例を示すものであり、同図(4)は断面図、同図(5)はその下面図を示すものである。

8…銀-塩化銀板、 9…銅板、 10、13…銀蒸着された樹脂板、 11、14…線材、 12…ケース、 15…リード線、 16…保持部材、 17…人体、 18…ペースト

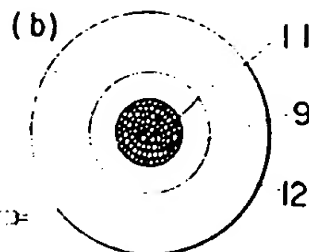
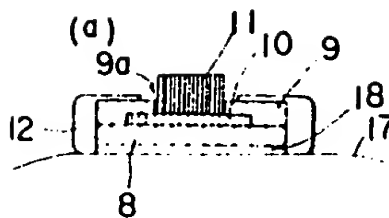
代理人 井堀士 廣 近 重 佑（ほか1名）

(6)

第 1 図



第 2 図



第 3 図

